REMARKS

By the foregoing Amendment, the specification has been amended to include headings as required by the Examiner, Claims 1-4, 8, 13-16, and 26-30 have been amended, Claims 9-12 have been cancelled, and Claims 13, 14, 27 and 28 are now indicated to be withdrawn from consideration. Favorable reconsideration of the application is respectfully requested.

The Examiner objected to the drawings as not showing the "fuel delivery means," "actuator means," and "electronic controller." These terms have been deleted from the claims, so that it is believed that the objections to the drawings can now be withdrawn.

The Examiner also objected to the specification as not including a number of headings for the various part of the application. The specification has been amended to include headings for the various parts of the specification as required by the Examiner, so that it is believed that the objections to the specification can also be withdrawn.

The Examiner objected to Claims 2-4, 9-11, 13-16, and 26-30 as beginning with the article "A," and this article has now been replaced by the article "The" as required by the Examiner. It is therefore believed that the objections to the claims can now be withdrawn.

Claims 1, 2-4, 8-11, 15-16, 26 and 29-30 were rejected on the grounds of indefiniteness under 35 U.S.C. § 112.

Claim 1 has been amended to remove "what proportion" from the claim.

Claim 1 has been amended to change "can receive compressed air" to "receives compressed air." It is made clear that this happens now in a "first operating condition."

Claim 4 has been amended to make clear that air "flows" rather than "can flow" and that this happens in "a second operating condition."

Claim 8 has been amended to refer to "a first operating condition" and "a second operating condition" in order to clarify the meaning of the claim.

Claims 9-11 have been cancelled.

Claim 15 has been amended to refer to "a first combustion mode" and "a second combustion mode." Reference to "early enough" has been removed from the claim.

It is therefore now believed that the rejection of Claim 1, 2-4, 8, 9-11, 15-16, 26 and 29-30 on the grounds of indefiniteness can now be withdrawn.

Claims 1, 3, 8-9, 15, 26 and 29 were rejected under 35 U.S.C. §102(b) on the grounds of anticipation by Yamane, in view of Santo. Claim 9 has been cancelled. As best understood, it is believed that the Examiner intended to apply the rejection of these claims on the grounds of anticipation by Yamane, which was discussed by the Examiner in connection with this rejection, and not on the grounds of obviousness in view of Santo, which was not discussed by the Examiner in connection with this rejection. Since the Examiner has only applied Yamane in connection with this rejection of the claims on the grounds of anticipation, the following remarks with regard to this rejection are only in response to the citation of Yamane in this regard.

Claim 1 has been amended to recite "all exhaust gases passing through the first exhaust duct flow through the first turbocharger prior to flowing through the second turbocharger." In Yamane there can be seen a bypass passage 7 with a valve 9 which operates to bypass the turbine 5a illustrated in the figure. In contrast, looking at figure 2 of the current application it will be seen that all the exhaust gas flowing through the passage 104 passes through the turbine stage 105a before passing on to the turbine state 107a.

Claim 1 has further been amended to recite "the flow of exhaust gas through the first turbocharger is varied in rate of flow by variation of opening and closing of the exhaust valve means with changes in engine speed." In Yamane we are told in the English language abstract that "the high pressure stage side exhaust valve is opened from the beginning of the exhaust stroke and then the lower pressure stage side exhaust valve is opened." This is also indicated by the valve lift diagrams 3 and 5. It will be seen that the operation of the two turbochargers is fixed for all engine speeds. In contrast, in the present invention the rate of flow of exhaust gas

through the passage 104 is varied with varying engine speed to vary operation of the turbocharger 105 with variations in engine speeds.

Claim 8 has similarly been amended to recite "all expanded exhaust gases leaving the first high pressure turbocharger are fed into the second exhaust duct to be relayed to the second low pressure turbocharger; all air delivered to the combustion chamber via the intake valve means flows through an intake air passage connecting the intake valve means to both the first high pressure turbocharger and also to a bypass passage through which air can bypass the first high pressure turbocharger with a bypass valve controlling flow of air through the bypass passage and the engine has a second operating condition in which air flows through the bypass passage bypassing the first high pressure turbocharger; and all air received by the combustion chamber is compressed first by the first turbocharger."

Claim 8 is novel over Yamane by having the above-noted feature 1, i.e., all exhaust gas flowing through the first exhaust duct passes through the first high pressure turbocharger (i.e., there is no bypass passage as shown at 7 in Yamane). Also Claim 8 has the feature of Claim 4 of a bypass passage which can bypass the compressor means of the high pressure turbo charger and which has a bypass valve controlling flow therethrough. In Figure 1 in Yamane all intake air passes through the compressor 5b and no bypass of compressor 5 b is possible. In Figure 4 of Yamane not all the air supplied to a combustion chamber passes through a single air intake passage and instead two separate air intake passages are provided for each combustion chamber, there being no bypass valve connecting the passage 4 with the passage 28 around the compressor 5b. In Figure 6 no bypass passage is provided for either of the compressors, 51b and 52b. In Figure 7 of Yamane while a bypass passage 8 is shown bypassing the compressor stage 5b, no bypass valve is provided in this bypass passage and instead valves 10 and 11 are provided, with the valve 10 in the branch or the inlet passage through which air passes to the compressor 5b and the valve 11 being downstream of the point at which the bypass passage rejoins the passage leading compressed air from the compressor stage 5b. Bypass passage 8 is continually open.

Claims 3 and 15 depend from Claim 1, and Claims 26 and 29 depend from Claim 8, so that it is respectfully submitted that Claims 1, 3, 8, 15, 26 and 29 patentably distinguish Yamane,

and that the rejection of Claims 1, 3, 8-9, 15, 26 and 29 on the grounds of anticipation by Yamane, in view of Santo, should be withdrawn.

Claim 2 was rejected under 35 U.S.C. §103(a) on the grounds of obviousness from Yamane in view of Santo. In JP01-285619 Yasuyuki Santo, all of Figures 2, 5 and 9 show that the turbochargers at turbine stages 9 and 10 are connected to a common exhaust manifold 8a leading from the combustion chambers and there is no indication that the supply of exhaust gas to turbine 9 is separate and independent from the supply of exhaust gas to drive the turbine 10. This directly teaches the way from the current invention. Also from Figure 1 it can be seen that not all intake air has to pass through compressor 3 and in Figure 8 that air is supplied separately to compressors 2 and 3. Claim 2 also depends from Claim 1, and it is respectfully submitted that Santo also fails to disclose all exhaust gases passing through a first exhaust duct flow through the first turbo charger prior to flowing through the second turbo charger, and the flow of exhaust gas through the first turbo charger being varied and right of flow by variation of opening and closing of the exhaust valve means with changes in engine speed, as is claimed. It is therefore respectfully submitted that Claim 2 also patentably distinguishes the combination of Yamane and Santo, and that the rejection of Claim 2 on the grounds of obviousness from Yamane in view of Santo should be withdrawn.

Claims 4 and 10 -11 were rejected under 35 U.S.C. §103(a) on the grounds of obviousness from Yamane in view of Hirabayashi. Claims 10 and 11 have been cancelled. With reference to Claim 4 a bypass passage is provided for the compression stage of the turbocharger 105 in which a bypass valve is located. In contrast in Yamane figures 1 and 6 it appears that no bypass is provided and all air must flow through two compression stages. In Yamane Figure 4 air is supplied separately by passages 28 and 29 to each combustion chamber; claim 4 now recites that all air arrives through a single passage connected to the high pressure turbocharger or to a bypass (i.e. the present invention can work with a single intake valve per cylinder, whereas Yamane Figure 4 requires two intake valves). A bypass 8 is shown in Figure 7 of Yamane, but no bypass valve is provided in the bypass 8; instead a valve 10 is provided in the branch associated with the compressor 5B. This means that Yamane cannot direct all flow through the compressor 5B, but instead the bypass passage 8 is continually open.

The Examiner acknowledged that Yamane fails to disclose an intake air bypass passage and a bypass valve. Hirabayashi was cited as teaching utilization of an intake air bypass passage through which air compressed by a second turbo charger can flow to an intake valve means, bypassing a first turbo charger and bypass valve means controlling flow of the compressed air through the bypass passage. Yugi Hirabayashi JP61-277818 shows an arrangement very similar to that of Yasayuki Santo. Again Figures 5 and 9 show that the two turbochargers draw exhaust from a common exhaust manifold 8a and there is no mention of separately supplying exhaust gas to each turbocharger from its own associated exhaust valve or set of exhaust valves. In Figure 1 not all intake air passes through the compressor 3. In Figure 8, the compressor stage 2 operates completely separately from the compressor stage 3, there being an air inlet passage 4 for the compressor stage 2 which is independent of the air intake passage 5 for the compressor stage 3 and no compressed air from compressor stage 3 passes subsequently through compressor stage 2.

It is therefore respectfully submitted that Claim 4 patentably distinguishes the combination of Yamane and Hirabayashi and that the rejection of Claims 4 and 10-11 on the grounds of obviousness from Yamane in view of Hirabayashi should be withdrawn.

Claims 16 and 30 were rejected under 35 U.S.C. §103(a) on the grounds of obviousness from Yamane in view of either Lovell or Gray. The Examiner acknowledged that Yamane fails to disclose the controller closing the exhaust valve means to trap combusted gases forming a mixture with the fuel and air and serving to delay ignition of the fuel and air mixture when the engine is operating with homogenous charge compression ignition. Lovell and Gray were cited as teaching a controller operating to close an exhaust valve means during an upstroke of a piston in order to trap combusted gases in the combustion chamber, the trapped combustive gases forming a mixture with the fuel and air and serving to delay ignition of the fuel and air mixture when the engine is operating with homogenous charged compression ignition. USPN 3,202,141 Lovell Wheeler and USPN 6,550,430 Clint D. J. Gray do not in themselves address an engine with two stage turbocharger, but do address the provision of HCCI combustion by the trapping of combusted gases. The Examiner suggested that it would be obvious to vary operation of the exhaust valves to trap combusted gases to facilitate HCCI. However, it is respectfully submitted that this is not an obvious thing to try. Given that the complexity of control must already be

provided to allow the differential operation of two exhaust valves in each cylinder, to add the further complexity of operating both exhaust valves so that they close early to trap combusted gases is not a step that will be taken lightly. In the past exhaust valves have been closed early where the exhaust valves are operated with the same lift profile, but the invention then promises closing a pair of exhaust valves early where exhaust valves have differing lift valves. It is therefore respectfully submitted that Claims 16 and 30 patentably distinguish the combination of the Yamane, Lovell and Gray, and that the rejection of Claims 16 and 30 on the grounds of obviousness from Yamane in view of either Lovell or Gray should be withdrawn.

Applicant has reviewed the prior art made of record and not relied upon, and it is believed that the prior art made of record and not relied upon is no more pertinent than the art actually applied.

In light of the foregoing, it is respectfully submitted that the application should now be in condition for allowance, and favorable reconsideration of the application and an early action in this regard are respectfully requested.

The Commissioner is authorized to charge any deficiencies or fees in connection with this amendment to Deposit Account No. 06-2425.

Respectfully submitted,

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